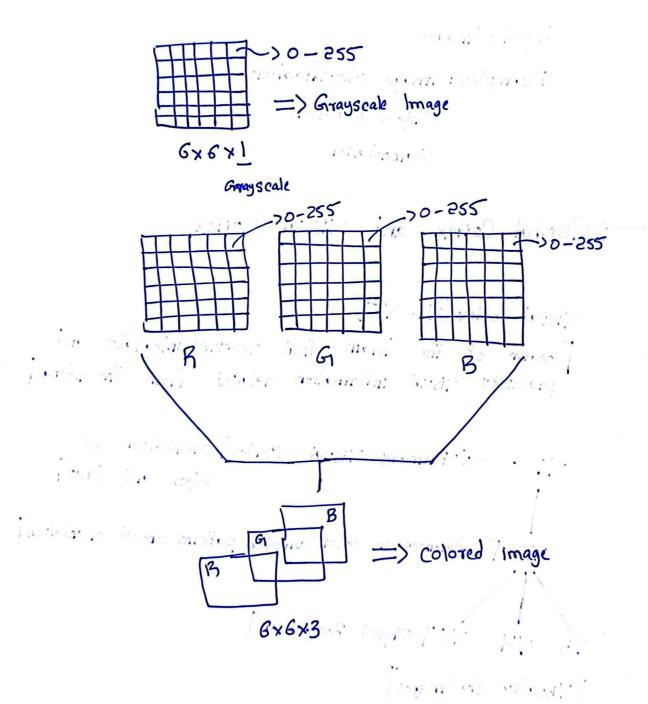
Convolutional Neural Network

Input: Images
Examples: Image classification.
Object detection
Segmentation .
S. C
Visual Cortex (VI-V5) [Region of the brain that receives, integrates and processes visual information relayed from the retina]
Primary Visual Cortex[Orientation of edges and lines] V2. [Differences in color, complex patterns, object orientation] V3 V4 V5 [Object Recognition] [Visualize the Images]
—> RGB Images and GreyScale Images
Image Red Green Blue

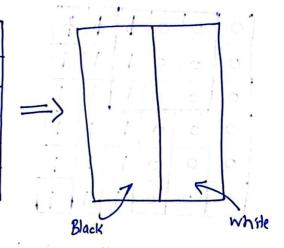


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problem with the land with

-> Convolution Operations in CNN

1	0	0	ပ	255	255	522	
	0	0	0	522	555	555	
I	0	0	0	522	522	255	
	0	0	0	522	522	522	
	0	0	0	522	522	562	
	0	0	0	522	255	522	
	6×6×1						



Steps

1 Normalize

Ly convert pixels between o and 1 (divide by 255)

		for the		"		ety.
	, 0	0	0	1	1	1
	0	O	0	1,0	١	1
	0	0	0	1	1	
	0	0	0	1	1	11
	0	0	0	1	1	V
1	0	0	0	1	1	1

PiHers Apply

			-1	1	T
0	0	0	1	-	_
0	0	0	1	1	1
0	0	0	1	1	1
0	0	0	1	1	1
0	0	0	١	1	1
0	0	0	1	1	1

	-
×	14
	C.
7	

	+2	0	-2
×	+1	0	-1
947A	Ž.	3×3 Priter	**************************************

0	-5	=
0	-1	,f.
2	C. L.	

0	-7		0
0	-4	-4	0
0	-4	-4	0
0	-4	_4	0

6×6×1

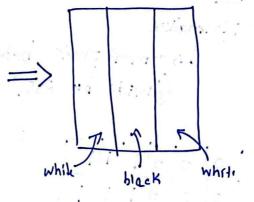
3 Stride Miles Miles Miles Miles

0	0	0.	b	ф	ф
0	0	0	١	١	1
0	0	0	1	1	1.
0	0	0	١	1	1
0	0	0	1	1	1
.0	0	0	1	-1	1

Stride = 1

4 Denormalize the output

the second secon					
255	0	0	255		
522	0	0	522		
522	0	0	522		
255	0	0	522		



> Filters

	_	
+1	0	-1
12	0	-5
+1	10	1-1
, ,	_	

vertical edge

+1	+5	+1
0	0	0
-1	- 2	- 1

horizontal edge

In real world, the valves and size of filters is not fixed.

> Formula

no. of fillers.

no. of pixels - filters + 1

$$= n - f + 1$$

	0	0	0	1	1	1	
	0	0	0	١	١	1	
	0	0	0	١	1	١	
	0	0	0	1	١	1	1
T	0	0	0	1	١	I	1
	0	0	0	1	1		

11 Padding

				4.40	C		j
	0	0	0	1	-1	1	,
	0	0	0	1	1	1	0
	0	0	0	1	1	1	
	,0	o	0	.1	l	1	
T	0	0	0	1	1	11	1
	0	10	O	1	i	.1	,
	1 8			10		7 _	
	cr-Q		8×	3	7	1.7	1

+1	0	-1
+2	0.	-2
+1	0	-)

=	0	-4	-4	0	
	0	-4	_4	0	
	0	-4	-4	0	
	0	-4	-4	0	
		6	×6		

$$n-1+2p+1$$
 $6-3+2p+1=6$
 $2p+1+3=6$
 $2p=6-4$
 $p=2/2$
 $p=1$

> Types of Padding

- 1) Zero Padding: fill padding values by 0.
- @ Neighbor Padding: fill padding by neighbor values

---> Pooling

- 1 Min Pooling
- @ Max Pooling
- 3 Average Pooling

	-4	0	- 2	4	1
	3	١	0	S	1
	١	0	١	١	1
1	4	6.	5	-	. 0
1	-1	S	0	. 0	0

Pool-size = 3

3	ч
6	5

Max Pooling

-4	-2
_1	0

Min

0	1
5	1/

11110 N 1948667 C

Average Pooling